REMARKS

Pending Claims

Claims 1, 3-8, 10-15 and 17 are pending. Claims 1, 8, 15, and 17 are the independent claims. Claims 1 and 15 are method claims. Claims 8 and 17 are directed to articles of manufacture. Applicants do not submit any amendments to the claims but present arguments and evidence to traverse the rejections posed by the Examiner.

Rejection Pursuant to 35 U.S.C. §103

The Examiner rejected the claims as obvious pursuant to 35 U.S.C. §103(a) in view of the reference to Fawley U.S. Patent No. 5,289,942 combined with Nishimura U.S. Patent No. 5,758,796. The Fawley '942 reference was not previously relied upon by the Examiner. Rather it has been newly applied and identified as new grounds for rejection in combination with Nishimura '796.

The previous response to the Official Action described many of the details of the claimed invention particularly as set forth in the independent claims. Briefly, each of the independent claims requires that the claimed subject matter has as an object thereof reduction of the effects of seismic or paraseismic stresses upon the appearance of buckling of a tank. An important feature in achievement of the object of the invention is the nature of the reinforcing material. The reinforcing material is a carbon fibre fabric material. Each of the independent claims specifically recites the utilization of a carbon fibre fabric material and carbon fibres.

Another important feature of the invention is the arrangement of the reinforcing material (carbon fibre fabric) with respect to the configuration of the tank. The claims require that the carbon fibre fabric be placed predominantly in a direction substantially perpendicular to the axis

of the metal tank and that the carbon fibre fabric fibres lie predominantly along a direction substantially perpendicular to the axis of the metal tank.

It is noted that each of the independent claims include the above discussed features. These features differentiate the present invention from the prior art.

Specifically, with respect to the Fawley reference, the teachings of that patent are directed to a method that minimizes the possibility of "catastrophic failure of storage tanks" see column 3, lines 34-35. The objective of the invention is to provide uniform inwardly directed forces tending to maintain the integrity of the storage tank when filled with fluid (see column 3, line 68-column 4, line 2). In this regard the type of failure involved relates to fracture or rupture of the tank shell of the type that may occur with respect to a flaw near a weld. Such a flaw may be result in embrittlement which will lead to fracture that propagates from the flaw (see column 1, lines 30-40).

Seismic or paraseismic stresses are very different from a propagating fracture as confronted in the Fawley reference. Fawley is directed to "brittle" or "ductile" fracture. The present claims are directed to providing a response to buckling in case of seismic or paraseismic stresses. The material in Fawley may be adapted to address the issue of propagating fracture, but it does not reinforce against the seismic or paraseismic stresses that result in buckling. This results because of the material chosen in the present invention, as set forth in the claims, and as discussed below.

The material (carbon fibre and carbon fibre fabric) chosen in the present case is an important feature of the invention. In contrast, in Fawley as mentioned above the composite material is made of extremely long independent filaments coated or sprayed with resin and then

cured. In particular, Fawley teaches the use of fiberglass filaments or an aramid material known as Kevlar or a polyester material known as Compet (see column 6, lines 23-32).

The present claims comprise carbon fibres which are in a form of a carbon fibre fabric. Carbon fibres result in an autonomous material wherein the fibres are held or engaged with each other. The independent filaments of glass type materials of Fawley do not fall into the characterization or definition of a fibre fabric material. Combining the Fawley materials with a resin on the filaments does not make them become a fibre.

Perhaps more clearly, the choice of the material in the presently claimed invention is clearly distinct from the prior art. The Examiner suggested that the secondary reference of Nishimura et al. Patent No. 5,758,796 demonstrates equivalence between various materials. Specifically the Examiner referred to column 3, lines 37-40. There is however, a significant difference between a carbon fibre material and all of the remaining materials suggested by Nishimura et al. This difference is specifically referenced in the specification for the present application at paragraph 23 for example which indicates that the carbon fibre fabric is a strong material having a typical tensile strength greater than 1500 MPa and a high elastic modulus typically between 200 and 400 GPa. This distinction is again referenced again at paragraph 32 of the present application wherein it is stated that the carbon fibre fabric on the external surface has been found to more easily stand seismic type stresses by modifying the behavior of the sheet metal of which the tank is made. This results because the carbon fibre fabric is elastic and can undergo high elongations before breaking. Buckling of the surface of the tank is therefore limited.

The characteristic of the combination of tensile strength and elasticity is a distinguishing feature with respect to the subject matter claimed. Nishimura does not overcome this distinctive characteristic. This results since Nishimura does not distinquish the materials based on their elasticity. As set forth on Exhibit A attached hereto carbon fibre materials have a modulus of elasticity in the range of 150 GPa. (And the fabric disclosed and claimed presently has a range of 200 to 400 GPa as a feature). All of the materials reference in the Nishimura reference (other than carbon fibre) have very low modulus of elasticity as contrasted to carbon fibre materials. ABS plastics for example are reported at 2.3. Glass in the range of 50 to 90 which is less than one half of the region of elasticity of the carbon fibre materials. Nylon and all of the various organic fibres referenced in the Nishimura reference are in the range of 1 to 5% of the elasticity data related to the claimed subject matter of the present invention. Thus, the claimed subject matter of the present invention is directed to a specific choice which is a difference in kind relative to the prior art. And the claims presently presented are unique because of the recognition that the material choice is a feature not taught by the prior art.

Another feature associated with the present invention which distinguishes it from the Fawley reference, in particular, is the manner of placement of the materials with respect to the tank. In the present invention, the carbon fibre fabric is placed predominantly substantially perpendicular to the axis of the metal tank. Further the fibres lie predominantly along a direction substantially perpendicular to the axis of the metal tank. This is contrasted with the Fawley reference wherein the filaments described therein are wrapped in a helical fashion around the exterior of the plates forming the metal tank (see column 6, lines 9-13). This is a structural distinction which, in combination with the choice of the carbon fibre material, renders the subject

matter of the present invention particularly useful with respect to addressing the issue of seismic and paraseismic stress response.

In view of the foregoing therefore applicant respectfully traverses the new rejections raised by the Examiner, requests reconsideration of the claims as presented and passage of the application claims to allowance.

Respectfully submitted,

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